ON-BOARD WIRELESS TRANSACTION SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an On-Board wireless transaction system and method and, more particularly, to such an On-Board wireless transaction system and method that enables the user to order commodities wirelessly in a vehicle and to complete the transaction on the real time. The aforesaid commodities include tangible goods and intangible services.

2. Description of Related Art

A motor vehicle may be equipped with a GSM wireless telephone system for contacting one's family and friends, as well as for dialing to a service center (for example, Travel the World Service Center) to ask for a variety of information services (stock, weather, traffic condition, department store promotion items, and etc.). There are motor vehicles equipped with a GPS (Global Position System) that enables the user to know the location of the motor vehicle and the business service information of nearby shops (such as location information of hotel, restaurant, theater, landscape spot, etc.).

However, the aforesaid systems enable the motor vehicle driver to obtain information only. When wishing to order attracted commodities, the driver shall have to dial the GSM system to contact the shop, directly requesting a reservation of the desired commodities by voice, or to contact the service center, indirectly asking the service center to make a reservation of the desired commodities. Because payment is not given in

the reservation, the transaction is not completely done. The reserved commodities could be sold out to another person when the driver reached the shop.

Therefore, it is desirable to provide an On-Board wireless transaction system and method that eliminates the aforesaid drawbacks.

SUMMARY OF THE INVENTION

The main object of the present invention is to provide an On-Board wireless transaction system and method, which enables the user to order commodities wirelessly in the motor vehicle and complete the transaction on the real time.

It is another object of the present invention to provide an On-Board wireless transaction system and method, which automatically calculates the accumulated transaction points of every fare card for bonus accumulated points promotion.

To achieve these and other objects of the present invention, the On-Board wireless transaction system comprises an ordering device, a card reader/writer, a GSM modem, and a microprocessor. The ordering device is adapted for inputting an ordering demand to order at least one commodity and to produce a transaction data corresponding to the ordering demand, which transaction data including transaction points to be deducted due to the purchase of the at least one commodity been ordered. The card reader/writer is adapted for reading the data of a fare card, or writing data into the fare card. The GSM modem is adapted for connecting to a GSM wireless network and transmitting data to the network. The microprocessor is adapted for receiving the transaction data

produced by the ordering device, controlling the card reader/writer to read the PIN (personal identification number) and value-added points of the fare card and to compare the value-added points of the fare card with the transaction points. If the number of the value-added points of the fare

5   card is not smaller than the transaction points, the microprocessor immediately controls the GSM modem of the On-Board wireless transaction system to transmit the PIN of the fare card and the transaction data through the GSM wireless network to a GSM modem of a shop-end computer of a contracted shop, enabling the contracted shop to provide

10   the commodity. Thereafter, the microprocessor calculates balance points of the fare card after deduction of the transaction points from the value-added points, and then controls the card reader/writer to write the balance points into the fare card, and then ends the transaction. Therefore, the invention enables the user to directly order commodities wirelessly in

15   the motor vehicle and complete the transaction on the real time, which is different from a reservation only.

According to the present invention, the fare card can be an IC chip card, magnetic card, or any other equivalent card having data storage function. The transaction data, in addition to the aforesaid

20   transaction points, further includes transaction time, commodity code and/or name, commodity unit price, or quantity. The card reader/writer is capable of writing each the aforesaid transaction data into the fare card to record transaction history.

The commodities orderable in the On-Board wireless transaction

25   system can be all tangible goods (for example, theater/entertainment

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center ticket, season-change clothes, hotel first-night reserved room rate, restaurant deposit, vehicle repair and maintenance deposit, ... and etc.), or intangible value-added services (for example, landscape point introduction, one-line fortune telling, multimedia audio/video program, ... and etc.).

Further, the card issuing organization can also provide every contracted shop with a shop card for storing therein a PIN of the respective contracted shop and recording the accumulated points. Every contracted shop can use another card reader/writer of the shop-end computer to read/write its shop card, so as to add points obtained from each transaction to the shop card for further refunding from the issuing organization. The shop-end computer can calculate the accumulated transaction points corresponding to every PIN of the fare card for providing a bonus accumulated points promotion.

The On-Board wireless transaction method used in the aforesaid On-Board wireless transaction system comprises the steps of:

A) Using the ordering device to input an ordering demand, the ordering demand including a transaction data of transaction points to be deducted due to the purchase of at least one commodity been ordered, and controlling the card reader/writer of the On Board unit to read the PIN and the value-added points of the fare card;

B) Calculating balance points of the fare card after deduction of the transaction points from the value-added points; and

C) Driving the GSM modem of the On Board Unit to wirelessly transmit the PIN of the fare card and the transaction data to the GSM

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modem of the shop-end computer of the contracted shop and then driving the card reader/writer of the On Board Unit to write the balance points into the fare card to complete the transaction.

The aforesaid method can be achieved by means of a software program, i.e., the method can be prepared by means of a computer language, and the prepared software program is loaded in a computer readable recording medium, which can be a hard disk, a floppy disk, a CD-ROM, a ZIP, a MO, an IC chip, or any available device containing the recording medium readable to the microprocessor usable to any person skilled in the art. Preferably, the software program is loaded in a RAM (random access memory) for updating easily.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is system architecture block diagram of an On-Board wireless transaction system according to the present invention.

FIG. 2 is a flow chart explaining the transaction method through the On-Board wireless transaction system according to the present invention.

FIG. 3 is a detailed flow chart of the present invention.

FIG. 4 is a system architecture block diagram of an alternate form of the On-Board wireless transaction system according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, a conventional card issuing organization (for example, Mondex electronic cash system) **4** issued multiple fare cards **C** as usual. Every fare card **C** stores a respective PIN (personal identification number) and a predetermined number of value-added points **S**. When the user paid a certain amount of money to purchase a new fare card **C** from the issuing organization, the issuing organization stores a number of value-added points **S** in the fare card corresponding to the amount of money paid. The user can use the purchased fare card **C** to buy commodities from either of the contracted shops **3**, and the shop **3** deducts the consumed points **P** from the value-added points **S**. Therefore, the fare card **C** is called as electronic cash, and used as cash.

The contracted shops **3** gather all the points ΣP they earned, and then issue a debit note and mail to the issuing organization **4** for payment. Alternatively, every shop **3** can link the financial exchange terminal **32** (i.e. fax machine, modem, etc.) of the respective shop-end computer **30** to the issuing organization **4** wirely through a PSTN (public switch telephone network) to provide the data for refunding the money. After the points and amount of the shop's debit note have been well checked, the server **41** of the issuing organization **4** transfers the money Σ$ from the issuing organization's account **51** in the financial organization **5** (such as a bank) to the account **52** of respective shop **3**.

The invention is based on the conventional aforesaid financial interrex-change environment, basically, and moreover enables a

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transaction to be done wirelessly in a motor vehicle **1** on the real time. The commodities to be ordered in the On-Board wireless transaction system of the present invention can be any tangible goods (for example, theater/entertainment center ticket, season-change clothes, hotel first-night reserved room rate, restaurant deposit, vehicle repair and maintenance deposit, … and etc.), or intangible value-added services (for example, landscape point introduction, one-line fortune telling, multimedia audio/video program service, … and etc.).

The fare card **C** is preferably an IC chip card for the advantage of high storage capacity. Of course, a magnetic card, or any other equivalent card having data storage function may be used.

FIG. 1 shows the On Board Unit **1** (OBU) of a vehicle connected to the GSM modems **31** of the shop-end computers **30** of multiple contracted shops **3** through a GSM wireless network **2** to order commodities from the shops **3**. The On Board Unit **1** comprises an ordering device **11**, a card reader/writer **12**, a GSM modem **13**, and a microprocessor **14**. The ordering device **11**, the card reader/writer **12**, and the GSM modem **13** are respectively connected to the microprocessor **14**.

Before ordering commodities **M** from the contracted shops **3** of the issuing organization **4** through the GSM wireless network **2**, the user must purchase a fare card **C** in advance. When starting a wireless transaction, it runs subject to the steps shown in FIG. 2:

Step SA：   Use the ordering device **11** to input an ordering demand. The ordering device **11** can be as simple as a touch button, a keyboard, or a browser. For example, the staff of a service center may assist the user to

download commodity menu for ordering, enable the user to browse the menu on the screen and ordering the desired commodity **M** with the touch bottom or touch screen. After input of an ordering demand, a transaction data **D** is produced. The transaction data **D** includes the transaction points **P** to be deducted for the purchase of the commodity **M** concerned. Further, to the card reader/writer **12** reads the PIN and the value-added points **S** stored in the fare card **C**.

Step SB: The microprocessor **14** calculates balance points **R** of the fare card by deducting the transaction points **P** from the value-added points **S**, and then (Step SB1) compares the balance points **R** with 0, so as to judge if the value-added points **S** of the fare card **C** is enough or not when the balance points **R** is greater or equal to 0. Alternatively, the microprocessor **14** can be controlled to directly compare the value-added points **S** with the transaction points **P**. If the comparison result indicates the value-added points **S** not smaller than the transaction points **P** of the transaction data **D**, it means the transaction can be continued.

Step SC: The GSM modem **13** of the On Board Unit **1** is wirelessly connected to the GSM wireless network **2**, and the PIN of the fare card **C** and the transaction data **D** (including transaction points **P**) are transmitted to the GSM modem **31** of the shop-end computer **30** (Step SC1). In this embodiment, please see also FIG. 3, the shop-end computer **30** recognizes the PIN of the fare card **C** and the transaction data **D** (including transaction points **P**) first for security reason. When recognized (Step SC2), the shop **3** provides the ordered commodity **M** by mail, data download … etc to the user, and feeds back a recognition code

to the GSM modem **13** of the On Board Unit **1** (Step SC3), causing the card reader/writer **12** of the On Board Unit **1** to write the balance points **R** obtained from the aforesaid calculation into the fare card **C** and then to complete the transaction (Step SC4).

5   As indicated above, the invention enables the user to order commodities wirelessly in the motor vehicle and complete the transaction on the real time. The aforesaid transaction data **D** may further include the data of transaction time, commodity code and/or name, commodity unit price, or quantity. The card reader/writer **12** writes all the

10   transaction data in the fare card **C** for use as history record.

        For easy management, the issuing organization **4** provides a shop card **C'** to every contracted shop **3**, so that every contracted shop **3** can use the card reader/writer **34** of the shop-end computer **30** to write the accumulated points ΣP into the shop card **C'**, or to output the

15   accumulated points ΣP and the PIN **ID'** of the shop card **C'** to the server **41** of the issuing organization **4** when asking for payment.

        FIG. 4 shows an alternate form of the present invention. According to this alternate form, the On Board Unit **1** is same as the embodiment shown in FIG. 1, however the contracted shops are

20   integrated into a customer service center **3'** that receives all orders, deducts purchased points, and distributes points to every shop after transaction. Therefore, the user needs only to remember the telecommunication number of the customer service center **3'**, and needs not to remember several telecommunication numbers of each of

25   contracted shops. Further, the computer **30'** of the customer service

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center **3'** calculates the accumulated transaction points **P** of every PIN to decrease the calculating load of shop, and to arrange an accumulated bonus promotion activity for the user.

As illustrated in FIG. 4, the GSM modem **13** of the On Board Unit **1** is wirelessly connected to the GSM modem **31** of the computer **30'** of the customer service center **3'**, enabling every transaction to be done on the real time. A memory device **33** is provided for the storage of multiple transaction data **D** temporarily, so that the GSM modem **31** of the computer **30'** of the customer service center **3'** can be connected to the server **41** of the issuing organization **4** later at a particular time to exchange information, preventing network line busy.

Further, in either of the aforesaid two embodiments, the fare card **C** has a predetermined value-added points **S** stored therein when new buy. Upon the points **S** using up, the user can use an auto teller machine **50** (shown as Fig.4) to transfer an amount of money from the user's personal account **53** in a financial organization **5** to the account **51** of the issuing organization **4** in the financial organization **5**, so as to purchase new points, enabling purchased points to be written in the fare card **C**.

Alternatively, the customer service center **3'** can transfer an amount of money from her account **52'** in the financial organization **5** to the account **51** of the issuing organization **4** in the financial organization **5** to purchase a lot of points in advance, so that an user can ask the customer service center **3'** for help when in the motor vehicle and unable to go to an auto teller machine **50** to transfer the money. In this case, the customer service center **3'** uses the GSM modem **31** of the computer **30'**

to download wirelessly a small amount of points to the GSM modem **13** of the On Board Unit **1** and to write the small amount of points into the user's fare card **C** for use. Thereafter, the customer service center **3'** issues to the issuing organization **4** a debit note subject to the transaction data **D** (including the PIN of the user's fare card **C** and the downloaded points **P**), asking the issuing organization **4** for payment. When the debit note checked, the issuing organization **4** transfers the amount requested from the account **51** of the issuing organization **4** in the financial organization **5** to the account **52'** of the customer service center **3'** in the financial organization **5**, and then demands the user's account **53** in the financial organization **5** subject to the PIN of the fare card **C** for refunding the money.

    The On-Board wireless transaction method can be written as a software program with computer language. The software program thus prepared can be stored in a recording medium readable to a microprocessor, or stored in any device containing the recording medium. The device containing the recording medium readable to the microprocessor can be a hard disk, a floppy disk, a CD-ROM, a ZIP, a MO, an IC chip, a RAM, or any available device containing the recording medium readable to the microprocessor usable to any person skilled in the art.

    Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.